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with walnut and ebony foundations, pictures in walnut frames, or surrounded with shadow boxes, crazy-quilt tidies on the chair backs, and vivid cloths and scarfs for the tables. Everything in the room should be light and delicate in color. Water colors in pale gray mats and gold frames, or white frames, would be better on the walls than oil paintings, unless the latter were represented by vaporous Corots or high keyed Fortunys; furniture not of the renaissance shapes, because were affected and weak, but of the colors employed by upholsterers of the renaissance epoch, would be more fitting than objects in dark woods; the curtains should be of madras, with creamy tints, rather than cold and starchy-looking lace; the rug or carpet, while a little stronger suggestion of stability and substance is permissible under foot, should be of small pattern and delicate color. A room like this is one of the few that will bear a marble fireplace and mantel, though tile would serve a better purpose. Whatever *bric-a-brac* is distributed should be in pale shades of yellow, green, blue or rose. A few peach-blow vases would not upset the color equilibrium. In the dining-room more positive color is not only admissible, but necessary, in order to match the browns and reds of the copper and terra-cotta tints. Black walnut can be endured there but cherry and ripe oak are better, and more play and liberty can be given in the choice of pictures, portières, carpets and ornament than in the parlor. There is, perhaps, in such cases a temptation to go to excess, and to overload the apartment with objects that are of intrinsic value and beauty. The room bears such treatment better than a light one. If strong reds are introduced the complexions shown against them are apt to suffer. "I know a house," said Mr. Russell, "with a red room that gives the whole family the color of raw beef. They are rather highly-colored people—high livers, probably—and the strong red of the walls brings out the strong reds of their cheeks, so that they look like butchers."

C. M. S.

SANITARY HOUSE FURNISHING.

By GLENN BROWN, A.A.I.A.,

Consulting Architect for House Sanitation, Washington, D. C.

PART VI.—WALL TREATMENT.

AS in other decorations the character of the house and the owners monetary capacity must regulate the treatment of walls. Few coverings are more beautiful than natural woods finished and panelled. This wall treatment requires much labor and skill when it is properly constructed. It is, in other words, costly and not appropriate in cheap houses. When properly designed, made, put in place, and finished, it will answer all sanitary requirements in halls and dining-rooms, the compartments in which such treatment is generally used. The pores should be thoroughly filled with some of the many fillers in the market and polished. When cheaply or improperly constructed, wainscoting will form the very best hiding and abiding place for vermin that could be designed for them. Although the methods of joining and placing wainscoting or wall panelling in position belongs more properly to house construction than to furnishing, yet it will not be amiss to say a word as to the proper way of putting it in place.

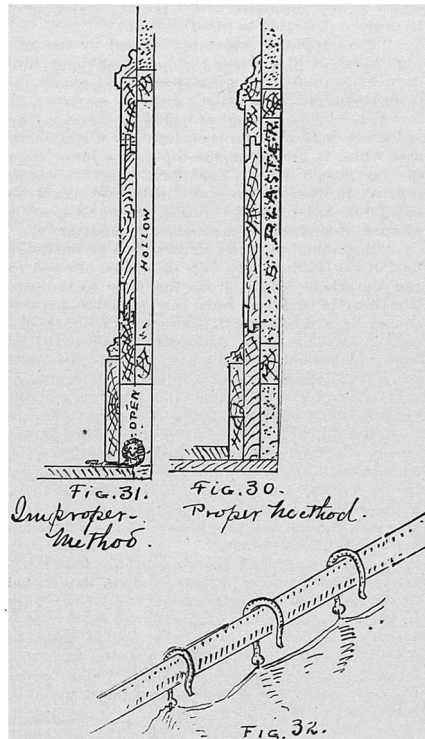
Frequently the strips of wood which run around the room and to which the wainscoting is screwed or nailed, project the thickness of the plaster. The wall is bare below the first strip, the vacant space thus left affords room for the vermin and the refuse they carry with them. The plastering should continue down to the floor even with the nailing strips. Every crevice and crack behind the wainscoting should be filled from the top of panelling to the floor. Figures 30 and 31 explain the proper and improper methods of putting such wood work in position. The back should be one even surface (see cut in this and previous articles) and the joints wedged and glued. Mouldings and carving, when indulged in, should be in low relief, so they can be easily dusted.

Lincrusta Walton has been put on the market in the last few years as a wall covering. It is excellent from both an artistic and sanitary standpoint. It is impervious, therefore no disease germs can be either absorbed or transmitted by it. Not being affected by water it can be thoroughly washed and kept clean.

The first cost of Lincrusta being considerable will prevent its general use. The common paper hanger is not able to put it on; it is necessary for the workmen to have experience. Four coats of good paint is the best moderate cost wall covering. It is practically non-absorbent and is easily washed and cleaned.

Paper is the least sanitary method of wall

decoration. Paper can absorb and transmit deleterious germs. With rare exceptions it can never be washed. The paste is liable to decay, especially in damp places, giving nourishment to *fungi* or *bacteria*. If the use of poisonous colors is prohibited in the manufacture of paper, its cheapness would more than balance its disadvantages in parlors and bed-rooms. It should be avoided in kitchens, bath-rooms or any place where contaminated matter might be absorbed. Stamped leather makes a rich wall covering, while it is better than paper it is not equal to paint or Lincrusta from a sanitary standpoint. Tapestries and curtains when used to decorate a wall should be so designed that they can be easily taken down. I would suggest a pole with hooks instead of rings (see sketch Fig. 32).



At the late International Health Exhibition held in London, many wall coverings were on exhibition as a part of house sanitation. There were enameled brick, glazed tile, Lincrusta waterproof canvass, and prepared wall paper, all of which were non-absorbent and could be easily washed. The manufacturers were careful to make a statement that no arsenical or other poisonous pigments had been used in the manufacture of their papers.

POISONOUS PIGMENTS.

I think it is proper to devote the remainder of this article to poisonous colors used in our domestic house furnishing. That such poisons have been and are now used in the coloring of our domestic fabrics and wall papers has been repeatedly proved by analysis. Numerous cases of ill health have been traced to arsenical wall papers. These poisons act insidiously, their effects assume the forms of common ailments and are difficult to trace.

Arsenical compounds are the only ones which have been positively proved unhealthy when used in connection with coloring matter.

Recently it has been claimed that ultramarine must be added to the harmful list, as under certain circumstances it evolves sulphuretted hydrogen. This happens when its chemical constituents are decomposed by acids. The acid may sometimes be found in the paste. The remedy is plain to avoid all acids in paste.

How to protect ourselves against arsenical pigments without legislation is a question difficult to answer. Manufacturers may use such arsenical colors knowingly for their own advantage, or innocently by the use of such pigments, glue or size which they consider free from hurtful substances. If the manufacturers know little about the healthfulness or unhealthfulness of their papers, the dealers know less.

Arsenical poisons may be introduced into the system in the form of either gas or dust. The pigment is easily removed by friction from unglazed papers, and may be found in the form of dust upon any of hidden surfaces or tops of furniture mentioned in the previous articles: A case is on

record where an attack of sickness was brought on by moving a lot of books that had been a long time in place. They were covered with a green dust which was found on analysis to be arsenical.

Dr. Fleck, of Dresden, Roscoe the chemist, and others equally reliable and careful, have discovered arsenical gases (arseniuretted hydrogen), generated either from chemical combinations between the colors composing the pattern, or the paste and the colors. Dr. Stevenson, of Guy's Hospital, thinks that "the deadly gas arseniuretted hydrogen" may be formed by the combination between the products of decayed organic matter (paste on a damp wall for instance), and the arsenical pigments in the wall paper.

It would be natural to suppose that these poisonous colors are used in the manufacture of papers because of their exceptional brilliancy. This is not the fact, as colors free from arsenic are brighter than similar colors made from arsenical compounds. Cheapness is the cause of arsenical pigments being used in the arts, but good authorities state that with new methods of manufacture non-arsenical would soon be as economical as the arsenical pigments. The easy method most people would think of guarding against such dangers would be to avoid the use of all arsenical colors. Unfortunately there is no easy guide to inform us which colors contain deleterious matter and which do not. Arsenic has been found in bright and dull greens, reds, pinks, browns, yellows, blue, and even in gray, drab and white. Arsenic is also used largely in preparation of aniline dyes. As a matter of course it is not only an impracticable matter but an impossible one to avoid the colors or combinations of them given in the above list. To show the extensive use of arsenic for such purposes, a Mr. Armourer, in a paper read at some health meeting, states as an ascertained fact, "that one hundred tons of arsenic were annually used for these purposes in England." Since then public opinion has caused manufacturers to abandon the use to a certain extent. The discussions in the papers have at least induced the manufacturers to claim non-poisonous colors in all their wall papers. Dealers may be honest in the belief that their papers contain no poisonous pigments, but this is no guarantee of the actual fact. Where there was no reason to doubt the honesty of a dealer's statement to the contrary arsenic has been often found in wall papers when analyzed.* Such pigments are often used unknowingly by manufacturers, who should be acquainted with the chemical constituents of all the colors they employ. When the papers are submitted to Prof. E. S. Wood for examination, he condemns all which do not come up to the following test: If enough arsenic is extracted from six square inches of paper to make a mirror on the inside of glass tube two millimeters in diameter the paper is unfit for use. This is one of the simplest test, but it would require an expert chemist to conduct it. When the number of patterns used in an ordinary house are taken into consideration, and the cost of an expert making an examination of each pattern, it will be easily understood that the burden would be too great for the average householder to bear. He would rather run the risk than pay the cost of such tests.

In a lecture, recently delivered by J. M. Thomson (Professor of Chemistry King's College, London), on the chemistry of pigments, he gives a group of colors which he considers dangerous to health. He gives no data to show under what circumstances they are dangerous, whether in their preparation, when mixed or used by painter, or in their place on the wall. There is no data of any kind to prove, as far as I can ascertain, that any of these pigments, except the arsenical ones, are dangerous to the health of occupants of a house in which they are used for decorative purposes. Lead colic is sometimes caused by fresh paint with white lead as a base, but this is while the work is unfinished.

I copy the list mentioned above:
"GROUP (OF PIGMENTS) DANGEROUS TO HEALTH."
(FROM J. M. THOMSON.)

Orpiment (a yellow)—arsenic sulphide.
Realgar (a red)—mercury binitride.
Turbit mineral (a yellow)—lead arsenite.
White lead.
Massicot.
Litharge.
Minium.
Naples yellow (lead antimoniate).
Lead oxy chloride.
Lead sulphate.
Cobalt arseniate.
Verdigris (copper acetate).
Scheele's green (copper arseniate).
Prussian blue (cyanogen and iron).
Prussian green.

* A little book on Our Domestic Poisons, by Henry Carr, gives several cases of this kind as well as other numerous facts on the subject.